U.S. EPA ISSUES AND NEEDS FOR RAPID MICROBIOLOGICAL METHODS

– Workshop on Molecular Methods for Water Quality

Themes for Water

- **Integrated approaches to clean water and safe drinking water**
- **Use of best available, 21st century science and technology**

Legislative Authorities

- **Safe Drinking Water Act (1974), amended 1986, 1996**
  - Requires EPA to set maximum levels for contaminants in water delivered to users of public water systems.
- **Clean Water Act (1977), 2000 Amendments**
    - BEACH Act
    - Wet Weather Quality Act
    - Estuaries and Clean Waters Act
  - Sets criteria and technology-based standards

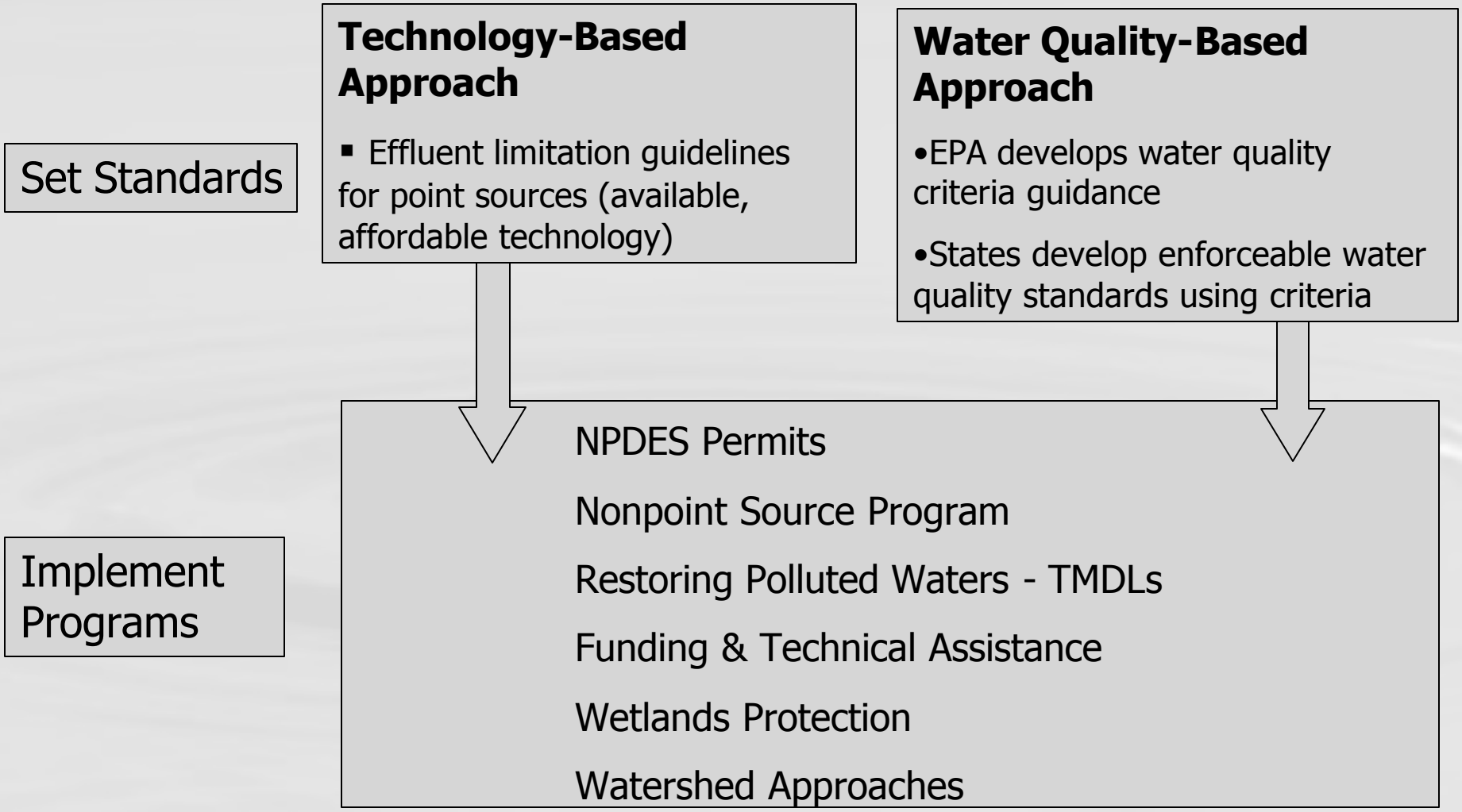
SDWA 96

- **Use of best available science**
- **Required “Microbial / DBP cluster” rules**
- **Mandated development of Contaminant Candidate List – which included microbes**
- **Reinforced obligation to review existing National Primary Drinking Water Regulations**
- **Highlighted sensitive human populations**

Administration of Clean Water Act Programs

- **CWA Program implementation is largely delegated to States and authorized Tribes (1987)**
  - 33-44 states delegated for key functions like enforcement and compliance, NPDES permitting, pretreatment program, etc.
  - Of 570 recognized tribes, 194 can now receive funds to administer CWA programs, 60 can receive nonpoint source funds, and 18 tribes have water quality standards

Clean Water Act Framework for Protecting and Restoring the Nation's Waters



Office of Water's Problem

- **How do we ascertain that water is not contaminated with microorganisms which cause human disease?**
- **The perfect measure is**
  - Well correlated with human disease
  - Widely applicable to various water scenarios
  - Inexpensive
  - Easy to use
  - Reliable, reproducible
  - Real time

What EPA Uses Today

- **Surface Water Treatment Rules – Drinking Water**
  - Turbidity (may not exceed1 NTU; 0.3 NTU in 95% daily samples in any month)
  - Heterotrophic plate counts (no more than 500 colonies / ml)
  - Total Coliforms (MCLG = 0; no more than 5% positive in a month; analysis for ***E. coli*** and fecal coliform)
  - ***Cryptosporidium*** (MCLG = 0, EPA method 1622)
  - ***Giardia lamblia*** (MCLG = 0, EPA method 1622)

What EPA Uses Today

- **Groundwater Rule – Drinking Water (proposed)**
  - State chooses one fecal indicator (***E. coli*** or *Enterococcus*)
  - And one indicator of viral contamination (coliphage – male specific and/or somatic)

What EPA Uses Today (cont.)

Recreational Waters

- **1986 Water Quality Criteria for Bacteria**
  - Fresh Waters: ***E. coli*** 126 per 100ml; **Enterococci** 33 per 100 ml
  - Marine waters: **Enterococci** 35 per 100ml
- **Beaches, Environmental, Assessment, Closure and Health Program (BEACH)**
  - Strengthen Beach standards and testing
  - Provide faster laboratory test methods
  - Invest in health and method research
  - Improve Public Information

EPA Future Uses for Rapid Methods

- **SDWA:**
  - Determine source water quality at intake
  - Monitor treatment plant efficiency
  - Monitor distribution system integrity
- **CWA:**
  - Insure uses are protected
  - Monitoring wastewater CSO and Blending
  - Development of ambient water quality criteria

Summary

- **Rapid methods should strive to be:**
  - Easy to understand, learn and use
  - Field portable or at least unsophisticated
  - Inexpensive
  - High precision, accuracy, and low lab bias
- **For rapid methods to be used for supporting standards or criteria they must be:**
  - Validated
  - Undergo multi-lab round robin tested
  - Peer reviewed.

OW Indicator Method Development Outline